

ABSTRACT OF THE DISCLOSURE

A technique is provided for forming a molecule or an array of molecules having a defined orientation relative to the substrate or for forming a mold for deposition of a material therein. The array of molecules is formed by dispersing them in an array of small, aligned holes (nanopores), or mold, in a substrate. Typically, the material in which the nanopores are formed is insulating. The underlying substrate may be either conducting or insulating. For electronic device applications, the substrate is, in general, electrically conducting and may be exposed at the bottom of the pores so that one end of the molecule in the nanopore makes electrical contact to the substrate. A substrate such as a single-crystal silicon wafer is especially convenient because many of the process steps to form the molecular array can use techniques well developed for semiconductor device and integrated-circuit fabrication.